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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/034,876	12/27/2001	Chung-Liang Hsiao	JCLA8242	1447

7590
J.C. Patents, Inc.
Suite 250
4 Venture
Irvine, CA 92618

05/12/2003

EXAMINER

NGUYEN, TRUNG Q

ART UNIT	PAPER NUMBER
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2829

DATE MAILED: 05/12/2003

Remain

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/034,876

Applicant(s)

HSIAO ET AL.

Examiner

Trung Q Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

- (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
- (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

2. Claims 1-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin et al. (U.S. 6,426,281).

Regarding claims 1 and 6, Lin et al. disclose in Figures 6-17 a method of forming a bump comprising a wafer Figs. 6 having plurality of chips via semiconductor 30 (column 7, lines 45-50) provided with a plurality of bonding pads 32 (column 8, lines 1-2), performing a wet etching using hydrogen peroxide (column 8, lines 5-20); forming an under ball metallurgy (UBM) 39 on each of the bonding pads 32 and forming a bump on the bump (see Fig. 10) layer 39 of Fig. 10.

Regarding claims 2 and 7, Lin et al. disclose in column 7, lines 65-66 wherein the material used to form the bonding pad is aluminum.

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Regarding claims 3 and 8, Lin et al. disclose in column 3, lines 1-16 wherein the material used to form the bump is gold.

Regarding claims 4 and 9, Lin et al. disclose in column 9, lines 28-35 further performing a dry etching process to removed a native oxide layer.

Regarding claims 5 and 10, Lin et al. disclose in column 8, lines 45-60 wherein bump is formed by plating.

Regarding claim 11, Lin et al. disclose in column 8, lines 5-20 wherein the peroxide is hydrogen peroxide.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (U.S. 6,426,281) in view of Saia et al. (U.S. 4,444,618).

Regarding claim 12, Lin et al. disclose in Figures 6-17 a method of forming a bump comprising a wafer Figs. 6 having plurality of chips via semiconductor 30 (column

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7, lines 45-50) provided with a plurality of bonding pads 32 (column 8, lines 1-2), performing a wet etching using hydrogen peroxide (column 8, lines 5-20); forming an under ball metallurgy (UBM) 39 on each of the bonding pads 32 and forming a bump on the bump (see Fig. 10) layer 39 of Fig. 10. Saia et al. disclose in Figure 3-7.

Lin et al. do not mention or disclose the step of performing a wet etching to at least remove the hillock on the bonding pad and forming a bump structure on the bonding pad. However, Saia et al. disclose a method of forming a bump on a wafer for a structure device comprising the step performing a wet etching to at least remove the hillock on the bonding pad; and forming a bump structure on the bonding pad (see Examples V and VI in columns 7 and 8).

Therefore, at the time of the subject invention, it would have been obvious for a person of ordinary skill in the art to modify the device of Lin et al. by adding the step of wet etching to remove the hillock on the bonding pad as taught by Saia et al. because it can prevent the many hillocks may be formed on the bonding pad cause nodules on the bump after the BM layer and the bump are sequentially formed, thus the UBM layer and the bump sequentially formed on the bonding pad can compensate for the uneven profiled of the bonding pad.

Response to Arguments

1. Applicant's arguments with respect to claims 1-11 have been considered. Some of the arguments are moot in view of the new explanations provided in the rejection for applicant's benefit. The other arguments are not persuasive.

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2. *The applicants argue that:*

Lin et al. the wet etching process is to strip the photoresist layer 38, but not to remove the hillock on the bonding pad.

The examiner respectfully disagree to the above argues because:

Lin et al. the wet etching process is to strip the photoresist layer 38 as to the limitation of claim 1. The examiner cannot find any limitation regarding removing or cleaning the hillock on the bonding pad in claims 1-11. In addition, In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., removing or cleaning the hillock on the bonding pad) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

5. Applicant's arguments with respect to claims 12-13 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within two months of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory

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action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trung Nguyen whose telephone number is 703-305-4925. The examiner can normally be reached on Monday through Friday, 8:30AM – 5:00PM. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-5841. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cuneo Kammie can be reached at (703) 308-1233.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-308-0956.

Trung Nguyen

Patent Examiner
Group Art Unit 2829
March 19, 2003



KAMAND CUNEO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800